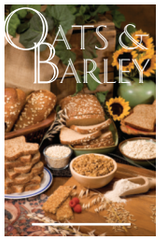
FORUM

ARS Research Partnerships Are Critical to U.S. Grain Production



Those "amber waves of grain" across America's farmlands are contributed to in part by public- and private-sector researchers working together. The Agricultural Research Service's oat and barley research helps farmers, food producers, and consumers reap production, quality, and nutritional benefits. The research community for U.S. oat and barley production is relatively small but is strengthened by remarkable coordination and cooperation. ARS's role is pivotal. Cooperative projects—including ARS and university researchers, with support from USDA and other federal agencies, and private industry—are enabling researchers to leverage resources and successfully work together for oat and barley improvement.

Major diseases, like cereal rusts in barley and oats and *Fusarium* head blight (scab) in barley, threaten growers and major U.S. industry sectors that thrive on these two crops. U.S. oat producers are concerned that supplies will be lost unless we protect the crop from new diseases. Oats are used in breakfast cereals, snack foods, flour, and baked goods and as animal feed. Last year, nearly 88 million bushels of oats were produced in the United States alone, valued at about $262 million.

Barley production was valued at $1.2 billion, with more than 239 million bushels produced in the United States. Barley is used in foods and malt (for brewing beer) and for animal feed. The economic benefit generated from this crop is vast. The malt industry alone generates 1.7 million jobs. Even a moderate disease outbreak in these crops can significantly reduce yields, which in turn can hurt the U.S. economy. The impact on global cereal production is even more severe, since these and other grains are staples in other countries.

ARS is leading oat and barley research partnerships, made possible by federal and private-sector funding. A major example is the ARS-managed U.S. Wheat and Barley Scab Initiative, which involves more than 70 scientists from universities, ARS, and other organizations coming together with farmers, millers, and processors to fight *Fusarium* head blight—an economically devastating crop disease. (See story beginning on page 4.)

Other cooperative oat and barley projects are made possible through funding from USDA's Agriculture and Food Research Initiative (AFRI) and the National Science Foundation (NSF). AFRI and ARS fund high-priority agriculture issues, such as breeding tools and molecular markers in oats and barley, while NSF provides grants for fundamental research relating to oat and barley improvement. Industries and associations, which include growers, millers, and processors, are also providing support for research on these crops.

These efforts are enabling oat and barley researchers to exploit new genomic strategies, develop new molecular markers, and work together for oat and barley improvements nationwide. The result is that researchers are now making good progress in developing new varieties with disease protection and improved nutritional quality—and even some with bioenergy traits.

ARS researchers are also collaborating with scientific organizations across the globe to respond to disease threats (see story on page 8). This international cooperation is bringing together advanced scientific knowledge in genomics, genetics, and breeding to help researchers identify effective genes from domestic and wild oat and barley lines that impart resistance to oat and barley diseases.

Beta-glucan is a soluble fiber that helps lower blood cholesterol levels and has been associated with maintaining healthy heart function. The *Dietary Guidelines for Americans* recommends eating more than three servings of whole-grain products a day. In addition, the U.S. Food and Drug Administration recently issued a regulation allowing companies to use a food-label health claim that associates soluble fiber from certain foods, like oats and barley, with reducing heart disease risks. ARS researchers have identified markers in the oat genome that can help them identify oat varieties high in beta-glucan. Other ARS scientists are developing all-oat and all-barley breads high in antioxidants, fiber, and vitamins—which may help Americans meet federal nutrition guidelines (see page 16). Scientists at ARS's human nutrition research centers continue to evaluate the role of oats in a healthy diet. ARS's role in this critical arena will ultimately help expand the market for these crops.

ARS researchers are also investigating winter barley's use as a biofuel (see page 14). These projects are part of a USDA bioenergy strategy focused on providing alternative petroleum fuel sources to Americans. The future emphasis will be on using and improving barley grain as an economically feasible bioenergy crop—offering U.S. farmers one more option for generating income from this crop.

Oats and barley play leading roles in our nation's food and feed production systems. Thanks to strongly coordinated partnerships, these two crops—and the industries built around them—will continue to thrive.

Kay Simmons
Acting Deputy Administrator
Crop Production and Protection
Beltsville, Maryland